

LASEREX 210i

230V (0LX2110) • 120V (0LX2121)

LASEREX 210i PVC/PET

230V (0PV2110) • 120V (0PV2111)

LASEREX 400i

230V (0LX4010)

LASEREX 400i PVC/PET

230V (0PV4010)

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SPECIFICATION

Part number	0LX2110	0LX2121	0LX4010	0PV2110	0PV2111	0PV4010
Voltage	230V ±10%	120V ±10%	230V ±10%	230V ±10%	120V ±10%	230V ±10%
Max flowrate	210 m³/hr 140 cfm	210 m³/hr 140 cfm	400 m³/hr 270 cfm	210 m³/hr 140 cfm	210 m³/hr 140 cfm	400 m³/hr 270 cfm
Wattage	0.35kW	0.8kW	1.2kW	0.35kW	0.8kW	1.2kW
Frequency	50Hz / 60Hz	50Hz / 60Hz	50Hz / 60Hz	50Hz / 60Hz	50Hz / 60Hz	50Hz / 60Hz
Sound Rating	52dBA	55dBA	52dBA	52dBA	55dBA	52dBA
Cabinet Height (inc castors)	1040mm 41"	1040mm 41"	1040mm 41"	1181mm 46f"	1181mm 46, 1/2"	1181mm 46, 1/2"
Cabinet Width (not inc hose)	455mm 18"	455mm 18"	455mm 18"	455mm 18"	455mm 18"	455mm 18"
Cabinet Depth (not inc hose)	480mm 19"	480mm 19"	480mm 19"	480mm 19"	480mm 19"	480mm 19"
Cabinet Weight (inc filters)	55Kg 121lbs	55Kg 121lbs	55Kg 121lbs	71Kg 156lbs	71Kg 156lbs	71Kg 156lbs
Hose (recommended)	51mm 2"	51mm 2"	51mm 2"	51mm 2"	51mm 2"	51mm 2"
Controls	IQ2000 intelligent control program continuously monitors critical safety parameters and ensures that the system runs at optimum power levels					
Management	IPN intelligent purification network when fitted allows real time monitoring and control of up to 31 machines from a central PC. Optional FDD software allows remote monitoring and diagnosis through a modem.					
Interfacing	J4 and J7 ports allow two way control of associated machinery					
Construction	All machines are constructed of corrosion resistant stainless steel and are mounted on four castors for increased mobility					
Bespoke specification.						
Please call your local supplier should you have a special requirement. Other machines are available to order.						

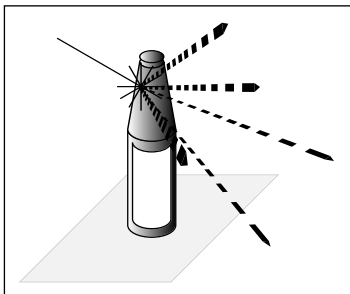
EC DECLARATION OF CONFORMITY

Model/Serial Number		
Conforms to the following EC directives (89/336)(91/263)(92/31)(98/37)		
Uses the following British Standards (BS EN 292-1)(BS EN 292-2)(BS EN 60204-1)(BS EN 294)(BS EN 50 081-1)		
Main filter assembly (BS EN ISO 2144)(BS EN ISO 536)(BS EN ISO 1924)(BS 5295)(UNI 7833)(BS 4400)		
Pre-filter assembly UNI 7832	Mechanical assembly (BS 8000/99)(IEC 60034/1)(BS 5000)(VDE 0530)	Enclosure ratings (IP 54)(IP 55)(IP 56)
Overload protection unit (BS EN 60947/4/1)	Control relay (BS 5424)(VDE 0660)	Pump (IEC 6000/34)(IP54)
Signed	Name	Dated

WARNINGS

- Always isolate the system from the mains power supply before removing the machine cover.
- Disposable gloves and a dust mask are supplied with replacement filters/prefilters. They should be used when removing filters and disposed of with the used filter in the bag which is also provided.
- Filters are manufactured from non-toxic materials.
- Filters and prefilters are not re-usable and no attempt should be made to clean them.
- Used filters and prefilters should be disposed of in accordance with local laws and regulations. The company and its agents disclaim all liability and responsibility for any harm, damage, contamination or injury caused by inappropriate or unlawful disposal.
- Purex systems use high pressure pumps, which may cause inferior filters to burst, allowing hazardous fumes into the workplace. Do not use filters that have only been tested to BS3928, BS5295 or AS208C as these standards are flow checks only and are designed to test filters used in general dust extraction and air conditioning.
- Consult the local regulations concerning fume extraction systems, as these may be subject to requirements including; periodic checks by authorised agencies, re-issue of certificates of compliance or equivalents etc. Consult your supplier if in doubt.
- Consult your supplier for information on maintenance agreements that will ensure conformance to local regulations.

INTRODUCTION



What happens when lasing

When a laser beam is applied to the surface of a material, several conditions can occur:

- The high temperatures generated cause the air near to the contact point to expand generally back in the direction of the lens (for stationary products)
- The laser beam causes incineration, vaporisation, melting and softening of the material depending upon the distance from the contact point. The rapidly expanding gases pick up and carry the removable particles and droplets at relatively high velocities away from the product material
- The contaminants released consist of the products of complete and partial combustion, including possible oxides of the base material, along with a wide variety of gases, in some cases noxious i.e. benzene, phosgene

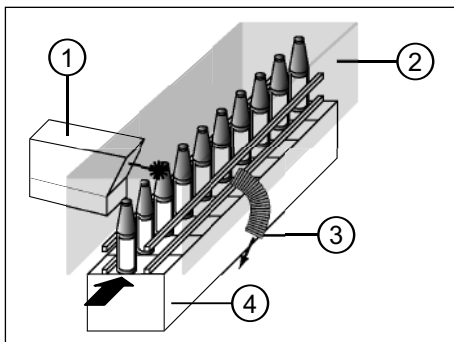
Why use fume extraction

Lasers are used to mark, etch and cut a wide variety of materials. During these processes, gases, vapours and particulate matter (dust) are released as airborne contaminants which, in most cases can be classified as harmful if inhaled. Airborne particles also cause problems for the laser if they are allowed to be deposited on the lens, or remain in the marking area, when loss of definition of the laser beam can occur.

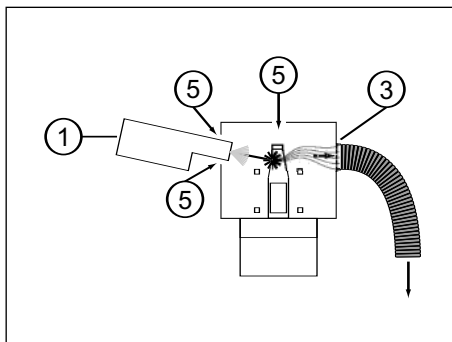
Deposition of particulates within the laser enclosure can result in contamination of the product and also the need for regular cleaning of associated operating equipment. The only practical method of overcoming the above problems is to remove these airborne contaminants as quickly and completely as possible by the provision of a fume extraction and filtration system.

The following guidelines are intended to assist the engineer when installing laser marking extraction systems and to optimise their performance.

INSTALLING THE CAPTURE SYSTEM



(fig 1.0)



(fig 1.1)

Escape of fumes and debris into the workplace (fig 1.0 + 1.1)

This can be solved by the provision of a suitable enclosure (2) to fit around the production line (4). Since the laser (1) and the process are usually required to be enclosed for safety reasons, this enclosure can also be used to contain the fumes. The enclosure should be as close fitting as possible with the minimum of open areas through which fumes can escape. When designing an enclosure, start with the idea of a completely sealed box, then remove panels to allow for working operations.

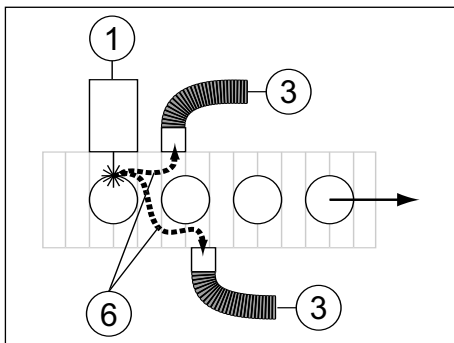
If necessary, make openings (5) in the enclosure close to the laser lens aperture to allow a small ingress of air to direct particles away from the lens. Position the extraction point (3) such that the flow of air from any inlets to the extraction point is generally away from the lens.

Deposition of debris on the laser lens

If the laser uses a supply of compressed gas to prevent dust landing on the lens, make sure that the supply pressure is adequate to keep the lens clean but not excessive. Excessive air can blow the fumes and dust away from the extraction point. Also, air introduced into the enclosure needs to be removed by the extraction system.

General positioning of the extraction point

Position the extraction point as close to the source of the fumes as possible or in a location which can capture the fumes and dust when these are projected away from the marking or cutting position. As each application is different, this is best achieved by site observation. The use of an extraction nozzle with an inlet profile that matches as far as possible the shape of the plume of fumes and dust should be used. i.e. circular or oval. Narrow slot nozzles are not advisable. Once the best position for the extraction point has been established, ensure that it is rigidly secured in position.



(fig 1.2)

Extraction requirements where the product is moving (fig 1.2)

In many cases, the product moves, usually on a conveyor belt, while the laser remains stationary. In the case of scribing or vectoring lasers, the beam also moves. Where the product moves at relatively high speeds e.g. bottling lines etc, the velocity components can become difficult to assess. i.e. particles have a velocity component away from the product surface but are also given a component in the direction of travel.

Also, gases and vapours can remain stationary or diffuse away from the source, or be trapped between the products and carried towards the exit from the enclosure. Additional complications occur where significant quantities of air are used to purge the lens housing as this can cause dispersion of gases and particulates within the enclosure.

Assess the direction and speed of the fumes (6) and position the extraction point (3) where the fumes and dust appear to be heading. If necessary or possible, use the air supply to the laser (1) to direct the fumes towards the extraction point. For a bottling line with a laser using an air supply, the extraction point would therefore be positioned on the opposite side of the guard tunnel to the laser, a distance downstream to allow for the movement of the air and fumes between the bottles.

INSTALLING THE MACHINE

Positioning the machine (fig 2.0 + 2.1)

The machine should be as near to the process as possible with space allowed for the following access:

- Front: Control panel and for replacing filters
- Rear: Exhaust air (4), cooling air (3) and electrical connections (5)
- Left side: Hose connection (1)(2)
- Top: Internal maintenance

Once in position, lock the two front castors by depressing the foot levers.

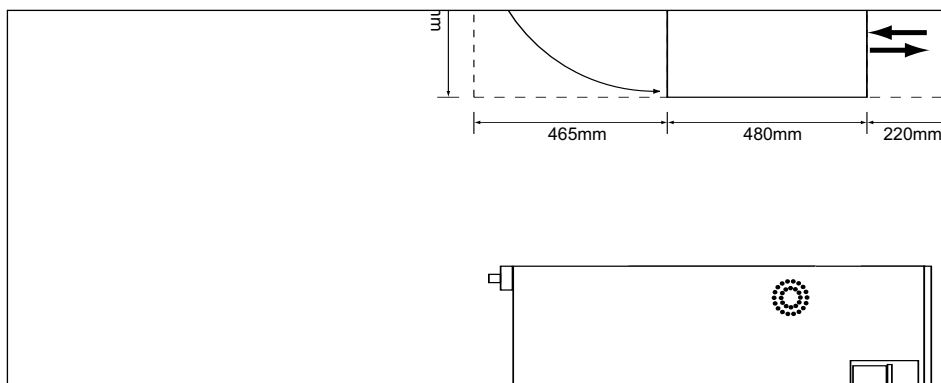
Hose connection (fig 2.1 + 2.2)

Incorrect connection or layout of hose can cause poor airflow, blockages and potentially dangerous build up of fume. Use the shortest length of hose possible and keep bends to a minimum. Your supplier can advise you of appropriate diameters and layouts of hose for your particular application.

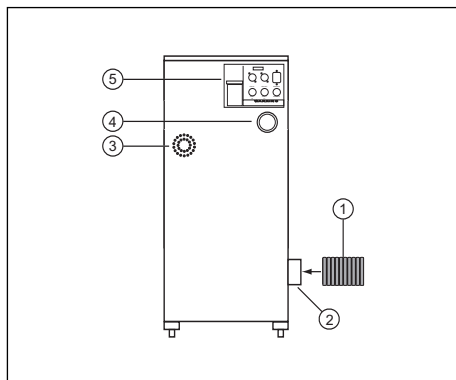
Ensure all connections are properly sealed and that there are no kinks in the hose. Once secured in position, connect the hose (1) to the inlet on the machine (2) either by pushing the hose onto the inlet or by using the connections supplied.

Electrical connection (fig 2.1)

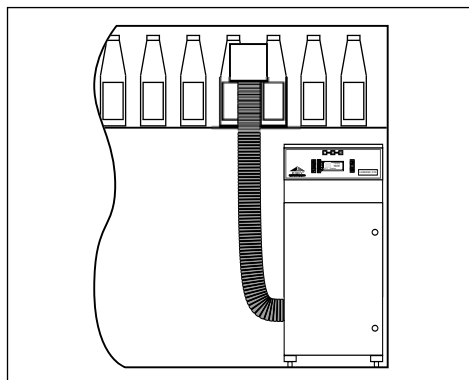
Prior to connecting the power supply, ensure that the voltage, frequency and power requirements are correct as shown on the label attached to the cabinet rear (5). Various connection methods are available to order.



(fig 2.0)



(fig 2.1)

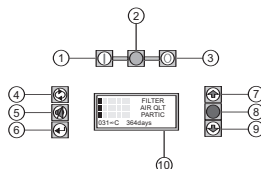


(fig 2.2)

IQ2000 CONTROL SYSTEM

Control panel

- | | |
|-------------------------|--------------------|
| 1: Power on button | 6: Enter |
| 2: Power on LED (green) | 7: Up |
| 3: Power off button | 8: Alarm LED (red) |
| 4: Escape | 9: Down |
| 5: Mute alarm | 10: LCD display |



Monitor Screen (LCD display)

The LCD display (10) shows the status of five operating parameters.

- Filter status (bar graph)
- Exhaust air temperature (numeric)
- Exhaust air quality (bar graph)
- Days remaining to next annual service (numeric, only on certain models)
- Particle monitor (bar graph)

Each of the 3 status bars has 7 LCD segments which progressively darken. On alarm you should use these indicators to establish why the alarm has sounded. ALWAYS CHECK THE DISPLAY TO IDENTIFY THE CORRECT FAULT. IF YOU DO NOT, YOU MAY BE CHANGING FILTERS UNNECESSARILY. Once you have identified the cause of the alert you can press the alarm mute button (5) while you identify the source of the problem.

A maximum operating temperature can be set using the control menu. When this temperature is exceeded the alarm will sound. The machine will count down 365 days and notify you when the annual service is due. The current state of the machine can be accessed from the monitoring screen by pressing ENTER (6). This will show the current date, hours run, machine number and the actual vacuum / set vacuum. Press ENTER to return to the monitor screen.

Menu system

The menu is accessed by pressing UP, DOWN and ESCAPE simultaneously. This displays the first menu shown opposite. The option which is currently selected is marked (*)

- To change the selection press UP or DOWN
- To make a selection or save a setting press ENTER
- To go to the previous menu without saving a change press ESCAPE
- To return to the monitor screen press ESCAPE repeatedly

Initial setup

Use the menu schematic opposite to set the following prior to operation:

- Language
- Units (metric or imperial - imperial not recommended)
- Local date and time

SETTING THE VACUUM

Automatic vacuum control

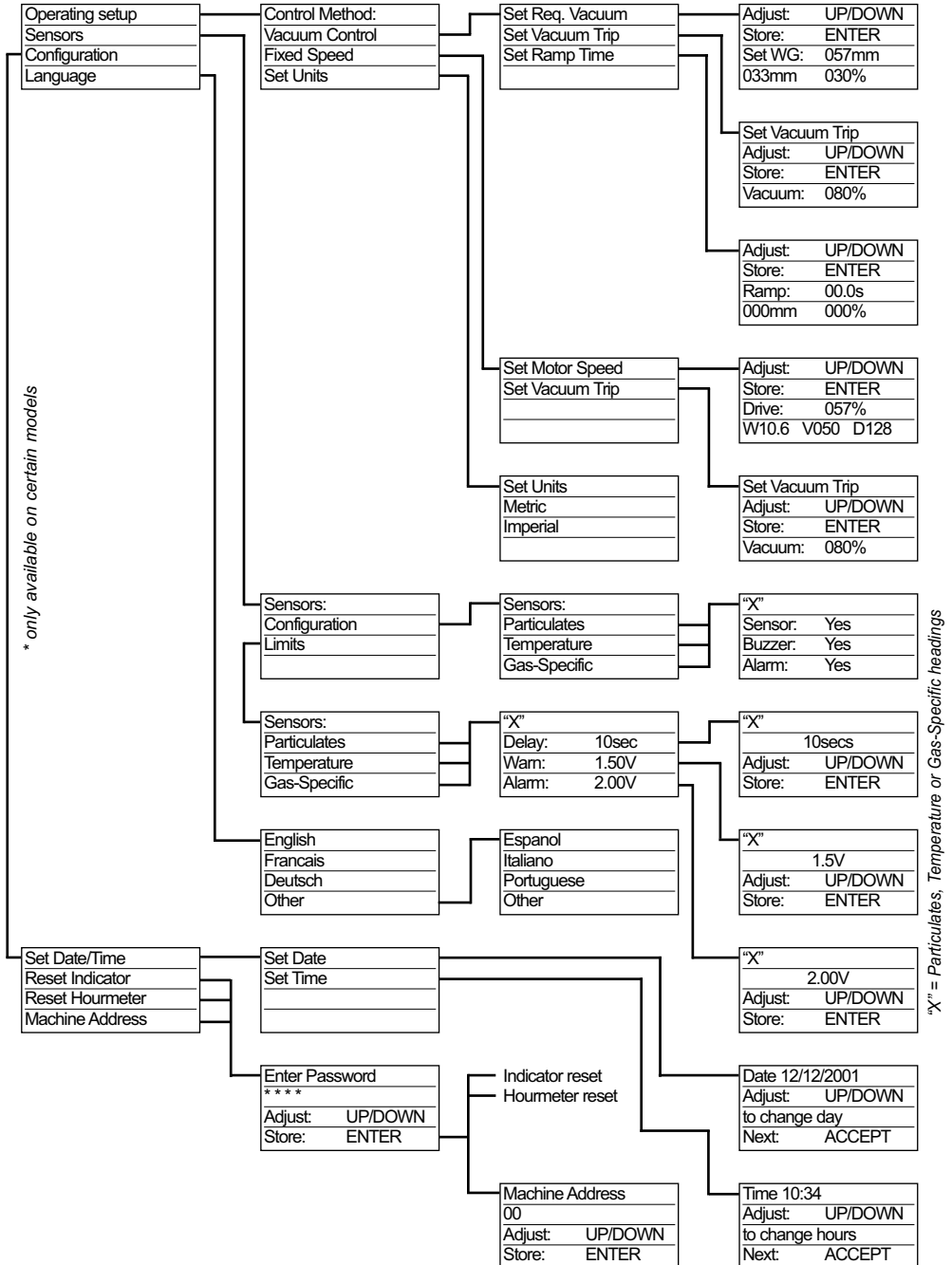
Warning - Do not set an unnecessarily high vacuum level as this can create false alarm conditions and reduce filter life

The extraction rate of the machine is governed by the pressure at the air inlet compared to the ambient pressure. This is referred to as the vacuum and is measured in mm of water scale. The correct vacuum required can be calculated but is more conveniently set using on site measurement or observation.

Access the IQ2000 control system. (press UP, DOWN & ESCAPE together) then: -

With the asterisk at 'operating setup' press ENTER; with the asterisk at 'Vacuum control' press ENTER; with the asterisk at 'Set Req Vacuum' press ENTER. Use UP and DOWN to set the vacuum using the figures below then press ENTER.

IQ2000 CONTROL SYSTEM



FILTRATION & CHANGING FILTERS

Multi-stage filtration

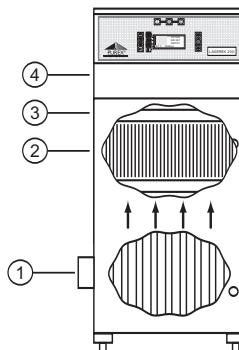
The machine employs a multi-stage filtration process. Contaminated air enters the machine from the process (1) and is passed through a pre-filter which removes larger particles. This prevents premature blockage of the main filter (2).

The main HEPA filter (2) removes 99.997% of particles larger than 0.3 microns in size and 95% of particles over 0.01 microns in size. The chemical filter section of the main filter (3) removes toxic gases. The purified air is now returned to the workplace (4).

Opening the cabinet door

It is important that the following procedure is followed when opening the door. Failure to do so will result in your process operating without extraction which is a Health & Safety hazard. The correct procedure is as follows: -

- Ensure your process is stopped
- Switch off your Purex machine at the control panel (see *control system*)
- Turn the two door locks on the front of the machine anti-clockwise
- Open the door



Important note

Always check the following points for debris build up before changing any filter. This avoids false alerts related to vacuum.

- Extraction nozzle
- Flexible hose and any pipework
- Air inlet
- Sense line (inside the air inlet)

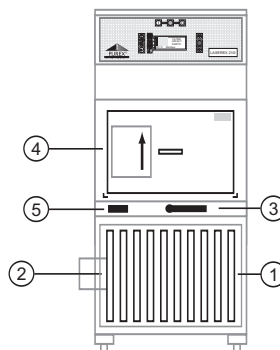
Changing filters

The machine will warn you with audible and visible alerts if a filter is blocked (see *control system*). When the filter alert triggers always change the pre-filter first and restart the machine. If the alert continues, change the main filter. Take care when removing filters as they are heavy. Always wear the protective gloves and mask provided and dispose of with the used filters in the bag provided.

Changing the pre-filter

The pre-filter is situated in the compartment underneath the main filter. The procedure to remove it is as follows: -

- Open the door
- Pull the filter (1) off the air inlet (2) and remove
- Insert the new filter, pushing the hole in the filter over the air inlet (2)
- Close and lock the door and restart the machine



Note: (210iPVC/PET & 400iPVC/PET only)

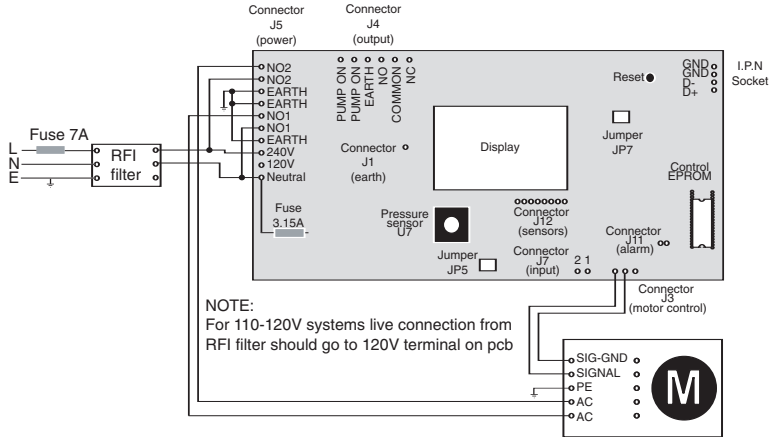
A chemical absorbent pad is situated underneath the pre-filter. This should be changed at the same time as a new pre-filter is installed.

Changing the main filter

The procedure is as follows: -

- Open the door
- Turn the filter locking handle (3) 180° anti-clockwise so that it is horizontal and in the filter unlocked position
- The filter (4) will drop slightly to allow release
- Remove the filter by sliding it towards you and remove it completely from the machine
- Ensure the coloured label on the new filter (4) matches the label on the machine (5)
- Insert the new main filter (completely) into the machine ensuring that the airflow arrow on the label is pointing up.
- Turn the filter locking handle 180° clockwise so that it is horizontal and in the filter locked position
- Close and lock the door and restart the machine

PCB WIRING SCHEMATIC



Output control using 'no volt' circuits accessible at connector J4

Alarm activated (normally open)

To signal that the alarm has been activated the external equipment should be connected across pins 2 and 3. When the alarm operates, these two pins will be shorted. This is independent of the "pump on" contacts.

Alarm activated (normally closed)

Pins 1 and 2 become open circuit when the alarm operates.

Pump Motor activated (normally closed)

Pins 5 and 6 are closed when the pump is on and open circuit when it is off.

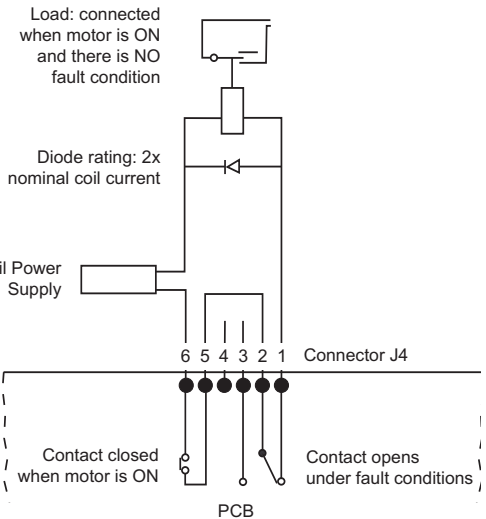
Pump and alarm (normally closed)

The diagram shows a possible circuit to signal an external system with a break when the motor switches off or an alarm is triggered

Any combination of connections can be used dependant upon requirements.

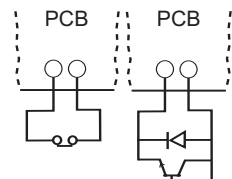
Maximum load across pins 1 or 3 to 2 = 250VAC, 5 A

Maximum load across pins 5 to 6 = 120VAC, 1A or 60VDC 1A



Input control using circuit accessible at connector J7

A transition from open to closed across no volt contact at pins 1 & 2 signals to the control PCB that the motor should be started. Similarly a transition from closed to open signals that the motor should be stopped. The state of the input on power up is checked and taken as a transition. The input can be controlled by any suitable method - a mechanical switch or transistor controlled switch are equally suitable. To minimise erratic behaviour a contact bounce less than 1 ms is recommended. Screened, twisted pair cable with a maximum length of 10 metres with screen connected to the external equipment only should be used to supply the switching signal.



ROUTINE MAINTENANCE

Schedule

Primary maintenance is filter replacement and the machine control system will indicate when this is required. To ensure the smooth running of the extraction machine and associated equipment, please perform the following periodic checks.

Daily - Visually check that the fumes are being drawn into the extraction point

Weekly - Check the status bars on the LCD display

Annual - Consult your supplier for maintenance checks and/or certification

Fuse replacement

Failure of any fuse may indicate a serious fault. Consult your supplier.

CONSUMABLES + SPARES

Consumables

- HEPA/Chemical filter
- Cuboid Pre-filter
- Concertina Pre-filter
- Chemical absorbent pad (210i PVC and 400i PVC only)

Spare parts available (supplied with fitting instructions where necessary)

- Door seal
- Filter seal
- Pump seal
- Hose replacement
- Fuses
- Pump
- PCB
- Filter monitor unit
- Manual

When requesting spares please quote the model and serial number of your system. These details can be found on the specification label at the rear of the machine.

Accessories

- Stainless steel castors
- Second laser head kit
- Hose extension

Depending on your application, various additional accessories are available. Please contact your supplier for further information.

Any details in these operating instructions are subject to change without notice

FAULTS DIAGNOSIS (CAUSE & SOLUTION)

SYMPTOM	NOTES	POSSIBLE CAUSE	REMEDY
Alarm sounds & red LED illuminated (1) (2)	Display shows 'FILTER BLOCKED' (3)	Filter blocked	If pre-filter not recently changed, change pre-filter
			If pre-filter recently changed, change main filter
	Display shows 'PARTICLES'	Main filter perforated (4)	Change main filter
		Main filter not locked or not seated on gasket	Check lock & position of main filter
		Main filter absent or edges damaged or seals damaged	Check main filter, edges & seals
	Display shows 'GAS SENSED'	Exhaust monitor fault (5)	Change exhaust monitor
		Chemical filter saturated (6)	Change main filter
		Main filter not locked or not seated on gasket	Check lock & position of main filter
		Main filter absent	Fit main filter
Exhaust monitor fault (5)		Change exhaust monitor	
Extraction insufficient (7)		Extraction rate too low	Increase vacuum setting
		Filter partially blocked	Increase vacuum setting
		Filter blocked	If pre-filter not recently changed, change pre-filter
		Filter blocked	If pre-filter recently changed, change main filter
Control signal to laser incorrect	Laser is not switched on alarm condition	Cabling fault	Check all cabling and connections
		Fault in exhaust monitor	Change exhaust monitor
		Fault on control PCB	Change PCB
Motor does not run	Extraction is not switched with laser	Power supply absent	Check cabling and power supply
		Control signal absent or incorrect	Check cabling and check control signal
		Fault on control PCB	Change PCB
		Pump faulty	Change pump
LED not illuminated		Power supply absent	Check cabling and check power supply
		Control signal not received	Check cabling and check control signal
		Fault on control PCB	Change PCB
Odour in exhaust (8)	Chemical filter removes gases and vapours from air stream HEPA filter removes particles from air stream	Chemical filter exhausted	Change main filter
		Main filter not seated on gasket	Check position of main filter
Main filter absent		Fit main filter	
Particles in exhaust(9)		Main filter not seated on gasket	Check position of main filter
		Main filter perforated	Replace main filter
		Exhaust monitor fault	Change exhaust monitor
Main filter life short	Large particles will cause main HEPA filter to block prematurely	Pre-filter absent	Fit pre-filter
		Pre-filter perforated	Replace pre-filter
Alarm sounds, red LED illuminated, pump stopped	Thermal cutout on pump motor	Pump overheated	Check cooling vents inside and out. Switch off mains power, allow pump to cool down. Switch mains power on and activate system.
(1) Incorrectly fitted filters may allow air to pass through the system unfiltered - this might trigger an alarm.			
(2) If alarm condition is still indicated after taking all remedial action, the electronic control circuit or its connecting cables might be damaged.			
(3) Might be indicated if the air is flowing too freely into the system. This will happen if the connecting pipe has broken. Setting an unachievable vacuum can trigger this symptom. The pressure sensor tube(s) may be blocked or kinked.			
(4) The main HEPA filter will not perforate under normal usage. Damage to the housing might allow air to bypass the filter pleats within the housing. Using the HEPA without a pre-filter will reduce the lifespan.			
(5) Particles and gas are detected in the exhaust monitor housing above the pump. This is a sealed unit and should be replaced if faulty.			
(6) In high gas or vapour situations, the chemical filter will become saturated before the HEPA filter. As they are contained within the same filter, both have to be changed as one unit.			
(7) If the extraction is not removing the fume from the work area but the filter is not shown as blocked, the vacuum trip % might be set too low. The vacuum sensor might be blocked or the inlet hose obstructed.			
(8) Treat as 'GAS SENSED' alarm.			
(9) Treat as 'PARTICLES' alarm.			

WARRANTY REGISTRATION

Machine details	Your details
Model/Serial Number	Title
Purchased from	First name
Date of purchase	Surname
Process	Position
	Company
	Address
	Town/City
	Zip/Post code
	Telephone
	Fax
	Email

Photocopy and post or fax to:



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